Belden

Asset Condition Monitoring

Solution Brief

Optimizing efficiency, maximizing uptime, and securing future growth through asset monitoring

Asset condition monitoring and management is critical for companies as it impacts operations and finances. Organizations facing challenges on their industrial assets with aging, maintenance, climate factors, and regulations can benefit from tailored asset condition monitoring solutions that leverage data for real-time monitoring and optimization.

Proactive Asset Monitoring enhances risk analysis, optimizes performance, boosts cost efficiency, and enables timely maintenance. It also improves safety, and resilience to external events, and mitigates catastrophic failures.

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Current state and typical challenges

With supply chain and manufacturing disruptions, labor shortages, the high cost of repairs, and evolving customer demands ever present, production leaders face an uphill battle to stay on top of their operations. With disparate systems such as Manufacturing Execution Systems, Distributed Control Systems, finance systems and Enterprise Asset Management software all used to maintain an asset, there is a lack of visibility and transparency to be able to identify the opportunities and risks. This leads to:

- Increased unplanned downtime
- Higher maintenance and support costs
- Recreational or reactive maintenance that doesn't address root causes for failures
- Inability to meet critical business functionalities
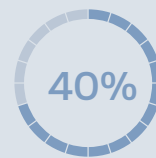- Inaccurate maintenance reporting

Asset condition monitoring in discrete manufacturing
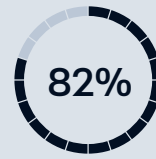
82% of manufacturers believe flexibility and the ability to dynamically shift production or product mix is critical to achieving growth goals.

>60% of capacity losses (after schedule losses) are due to equipment being unable to produce up to capacity.

40% of global manufacturers DO NOT use analytics data recorded from connected devices to analyze processes and identify optimization possibilities.

1.8x more cost to repair a failed asset than if the problem has been addressed before the failure.

Source: Accenture Research

Addressing key priorities

In many manufacturing organizations, monitoring the condition of Assets is a priority across multiple functional areas. Key leadership stakeholders may include the following:

CEO

The growth of our core business is being jeopardized by supply chain and manufacturing disruptions.

Manufacturing VP

How can we better utilize our asset base & lower conversion costs, while relying less on capital for capacity?

EH&S VP

How can we create a zero-incident company to protect our license to operate while reducing maintenance costs?

Plant Manager

Everyday we review yesterday's reasons for missing production targets. Unplanned downtime is killing us.

Asset condition monitoring interventions

Real-time visibility

Enable real-time asset visibility enables precise tracking, optimizing usage, and reducing downtime. This ensures efficient allocation and streamlined operations, enhancing productivity, cutting costs, and improving decision-making.

Intelligent optimization

By providing visibility into asset usage, asset operators can identify underutilized assets and optimize their allocation. This improves overall equipment effectiveness (OEE) and productivity.

Early anomaly detection

Early detection of anomalies enables refinement of certain operating procedures and improvement of the training of operators. Alerts received for deviations allow immediate corrective action to be takeny.

Target outcomes

2-3%
Increase in asset utilization

10-15%
Cutdown MRO inventory

2-5%
Improved throughput

Up to 25%
Increase in workforce productivity

Source: Accenture Research

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accenture Comprehensive asset management from strategy to deployment with proven success.	**End-to-end asset management transformation,** from strategy to implementation to managed services, leveraging the digital ecosystem.	**Broad range of Accelerators** ready to deploy methods, tools, diagnostic assets for different phases of client journey to accelerate value.	**1400+ skilled and dedicated IAM resources** globally in process and technology helping speedy deployment and quick realization of benefits.	**Proven track record** with Accenture being recognized leader in IAM space.
aws Fully managed, secure IoT platform allowing to millions of devices.	**Complete industrial IoT solution** through a set of fully managed services that are easy to deploy and manage.	**Collect, store, and analyze** device data through specifically designed services, even in noisy, unreliable environments.	**Massively scale** by allowing industrial IoT applications to connect to millions of devices.	**Secure** device fleets at scale with built-in device authentication and authorization to keep IIoT data and devices protected.
Belden Transform industrial operations with seamless, secure connectivity.	**Offers End-to-end ruggedized edge hardware and, AWS-powere software platform** to improve asset condition monitoring for manufacturers.	**Plug-and-play:** Secure and resilient network backbones that connect industrial assets in minutes.	**Near real-time insights** with edge computing on industrial gateways.	**Vendor-agnostic:** Convert 300+ industrial protocols to easily consumable formats.

Turning data into insights

Asset Condition monitoring can help manufacturers increase real-time visibility into asset health, optimize planned downtimes, and improve labor productivity. The example network diagram below shows how Belden hardware and software can be combined with offerings from AWS and Accenture to transform field-level data into a real-time insights needed to help monitor the condition of the asset.
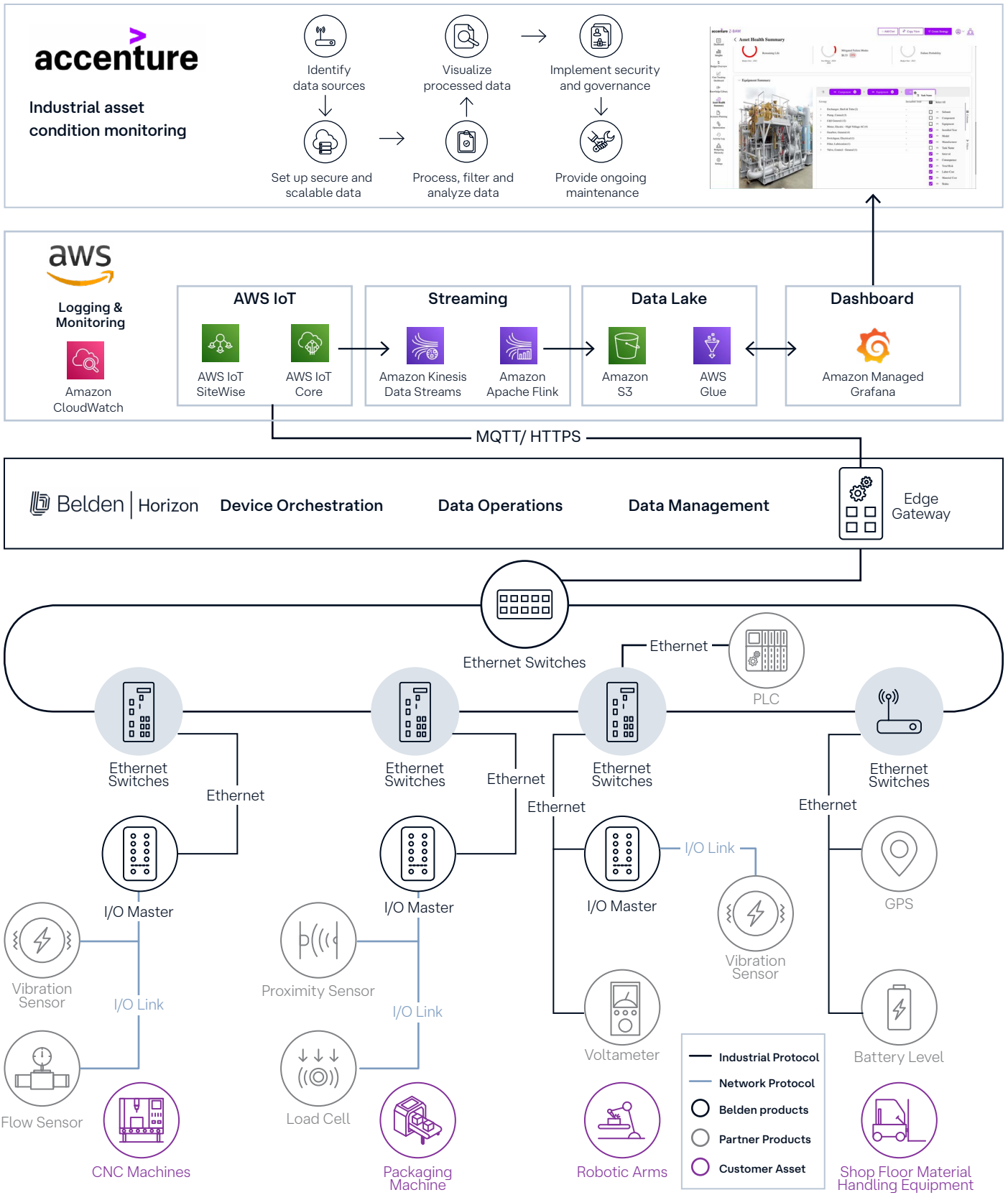
Case study: asset condition monitoring for leading european glass product manufacturer

When a European glass product manufacturer realized there was a lack of real-time monitoring and data storage for machine parameters, they came to Belden. The experts at Belden delivered a solution that acquired and transmitted data from field devices into a cloud-hosted IIoT platform for seamless visibility. With the right data and insights now in hand, the company has achieved a reduction in downtime and improved operational efficiency.

Challenges:

- The factory used old machinery lacking modern connectivity solutions

- Equipment had to withstand heat and dust common in glass manufacturing

- Lack of real-time monitoring and data storage for key machine parameters

- The solution had to work with AWS IoT Core and AWS IoT SiteWise securely.
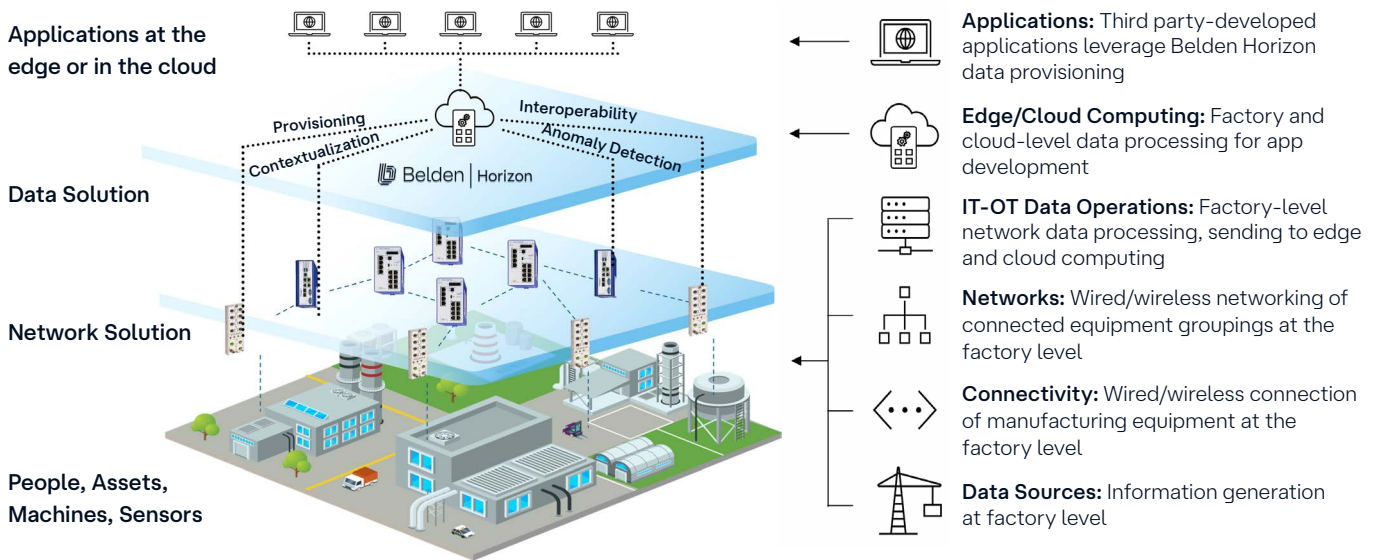
Solution:

- Belden's selected sensors that withstand harsh conditions

- Quick installation and connection of sensors

- Local data processing on the edge and alerts provided improved monitoring

- Provided a scalable solution integrated with AWS IoT

- Easy updates and security patches kept the system secure

Results:

- Significant reduction in downtime and waste, improving production

- Enhanced operator job efficiency with advanced alerts and dashboards minimizing manual checks

- Prevented material waste and increasing efficiency with LED indicators

- Improved decision-making due to robust data collection and analysis

The future of data convergence

Belden Horizon is a scalable, vendor-adaptable digital platform that encompasses our products and software, unifying data from disparate sources to deliver clean, analytics-ready information.

Applications at the edge or in the cloud

Data Solution

Network Solution

People, Assets, Machines, Sensors

Provisioning · Contextualization · Interoperability · Anomaly Detection

Belden | Horizon

Applications: Third party-developed applications leverage Belden Horizon data provisioning

Edge/Cloud Computing: Factory and cloud-level data processing for app development

IT-OT Data Operations: Factory-level network data processing, sending to edge and cloud computing

Networks: Wired/wireless networking of connected equipment groupings at the factory level

Connectivity: Wired/wireless connection of manufacturing equipment at the factory level

Data Sources: Information generation at factory level

Belden engaged a variety of Cloud Service Provider and system integrator partners for joint sales and delivery of these use cases. Partners mentioned in this document are for indicative purposes only.

Network and data foundation	Cloud infrastructure for data storage and processing	End user application and services
Belden	**aws**	**accenture**

Belden's network and data solution connects various energy monitoring and consuming assets to energy management applications.

Step 1: Build a resilient network to gather energy data using a combination of I/O systems, cordsets and managed switches.

BOBCAT: Managed switch for compact IIoT networking with advanced security, high port count and real-time communication.

I/O systems portfolio offers intelligent and reliable data transmission solutions from passive distribution boxes, fieldbus and modular I/O systems to high-performance modules.

Broad range of single-ended and double-ended **cordsets** for faster, easier installation and maintenance, delivering optimum signal protection.

Step 2: Activate edge computing to convert, contextualize and analyze data and run custom apps.

OpEdge-8D: DIN-rail-mount edge gateway device for processing large volumes of operational data generated in industrial environments on the edge infrastructure.

Step 3: Enable data interoperability to convert, contextualize and provision analytics-ready data to the cloud or other data destinations.

Belden | Horizon

Belden Horizon: Industrial remote connectivity and edge orchestration software platform enabling connection to OT assets and deploying AI models.

ProSoft Gateways: Enable dissimilar automation control equipment to share information and transfer control data through wired and wireless connectivity.

CloudRail.Box Max: Plug-and-play industrial edge gateway supporting connectivity methods like Secondary Sensors, OPC-UA, Modbus, and VSE.

Amazon IoT Core managed cloud platform that enables secure device connectivity and data processing at scale.

AWS IoT SiteWise simplifies industrial data collection, organization, and analysis at scale.

Amazon Kinesis Data Streams processes high-velocity IoT data for real-time analysis and insights.

Amazon Managed Service for Apache Flink dataflow engine for real-time data stream processing on high-through put data sources with low latency.

Amazon S3 enables storage of high-velocity IoT data, like sensor data from IIoT devices, for real-time data processing and analysis.

Amazon Glue is a serverless data integration service that simplifies data discovery, preparation, and transformation for analytics.

Amazon SageMaker is a fully managed ML service enabling custom model to develop, train and deploy for IIoT analytics.

Amazon Athena offers a serverless, interactive query service for easy data analysis, providing fast performance and flexible pricing models.

Amazon CloudWatch provides real-time visibility into system performance, operational health, and resource utilization.

Amazon Managed Grafana is a fully managed service based on open-source Grafana that makes it easier for you to visualize and analyze your operational data at scale.

Key Deliverables:

Identify data sources sensors, systems, services to be integrated for asset monitoring.

Set up secure & scalable data ingestion and storage for the identified sources in real-time.

Process, filter and analyze data to leverage Data Analytics for extracting meaningful insights and patterns.

Visualize processed data on dashboard, report & recommend insights enabling stakeholders to make data-driven decisions.

Implement security and governance adhering to security best practices & regulatory requirements.

Provide ongoing maintenance, monitoring, and support to ensure the IIoT solution continues to operate effectively.

Zero-Based Asset Management Application Suite with data-based decision making. Allows optimization of asset maintenance activities and costs. Zero-ased planning and budgeting for maintenance.

Accenture and AWS partnership: With more than **26,000 certified AWS professionals and 45+ AWS-awarded qualifications,** Accenture provides highly differentiated joint and aligned execution with AWS to address our client's toughest challenges.

Solution Brief

Scan to Contact us

About Belden

Belden Inc. delivers the infrastructure that makes the digital journey simpler, smarter and secure. We're moving beyond connectivity, from what we make to what we make possible through a performance-driven portfolio, forward-thinking expertise and purpose-built solutions. With a legacy of quality and reliability spanning 120-plus years, we have a strong foundation to continue building the future. We are headquartered in St. Louis and have manufacturing capabilities in North America, Europe, Asia, and Africa.

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